

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL

Experiences of Community
Health, Hygiene, Sanitation
and Nutrition

LEARNING CONTRIBUTIONS
OF REGIONAL CENTRES OF
EXPERTISE ON EDUCATION FOR
SUSTAINABLE DEVELOPMENT

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CONCEPT OF SUSTAINABLE NUTRITION – IMPLEMENTATION VIA ESD IN MUNICH

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The Regional Centre of Expertise on Education for Sustainable Development (RCE) Munich (BeNE München e.V.) is in Bavaria, South Germany. As the oldest RCE in Germany, it already has ten years of experience in all fields of Education for Sustainable Development (ESD). The RCE is structured as a network of currently 54 (educational) institutions and 21 individuals. One member of RCE Munich is the “Working Group Sustainable Nutrition”, and has been part of the development of the holistic concept of Sustainable Nutrition since several decades. In March 2017, the Working Group released the Online-Video-Course (OVC) titled “Sustainability and Nutrition”. Another member is the City of Munich, which through its regional programme “Organic City Munich” seeks to promote sustainable nutrition in Munich, mainly in out-of-home catering, especially within educational institutions. This case study covers the theoretical concept of sustainable nutrition as well as practical experiences with its implementation.

1. Development of the Concept “Sustainable Nutrition” (OVC, Unit 1)

The predecessor of the concept “Sustainable Nutrition” is the concept “Wholesome Nutrition” (“Vollwert-Ernährung”), which was developed at the University of Giessen in the 1980s. Wholesome Nutrition is a mainly plant-based diet, where minimally processed foods are preferred. The central food groups are vegetables and fruits, whole-grain products, potatoes, legumes and dairy products. Native cold-drawn plant oils, nuts, oleaginous seeds and fruits are also important, but should be consumed only in moderate quantities. If desired, small amounts of meat, fish and eggs can be consumed. This concept includes four equally important aspects: health, environment, economy and society (Koerber, Männle and Leitzmann, 2012). About a decade later, at the UN Conference on Environment and Development in Rio 1992, Sustainable Development was defined as the guiding concept for global development comprising three “classical” dimensions: environment, economy and society. In addition to sustainable consumption of resources, it requires that equal conditions for every human being on Earth are ensured (Schneidewind, 2011).

In 2005, Leitzmann and Cannon established the “New Nutrition Science Project” at a global scale, under the umbrella of the International Union of Nutritional Sciences and the World Health Policy Forum. They incorporated the complementation of the biological focus with environmental and social aspects (Cannon and Leitzmann, 2005; Leitzmann and Cannon, 2005).

A few years ago, in dialogue with members of RCE Munich and other experts of ESD, the Working Group Sustainable Nutrition included “culture” as the fifth dimension into the concept Sustainable Nutrition, as food habits are influenced by the respective cultural background (Figure 1). Culture has been part of the sustainability dialogue for many years, especially in ESD (Koerber, Bader and Leitzmann, 2016).

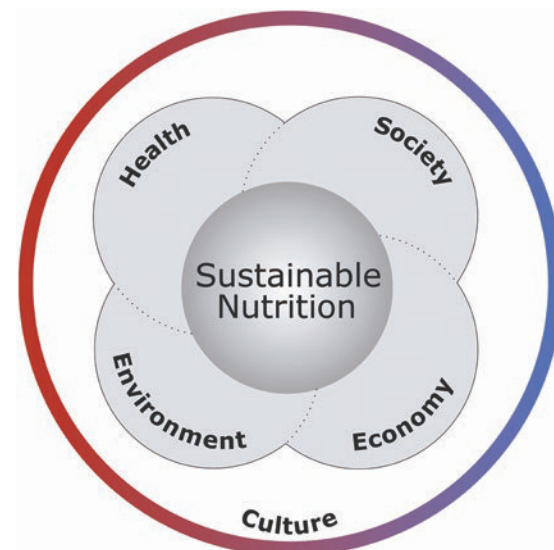


Figure 1: Five Dimensions of Sustainable Nutrition (Koerber, 2014; Koerber, Bader and Leitzmann, 2016).



All stages of the food supply chain are considered in the concept of Sustainable Nutrition (Koerber, Männle and Leitzmann, 2012; Koerber and Hohler, 2013).

- Input production (e.g. Sustainable Nutrition Principle 2)
- Agriculture (e.g. Principle 2)
- Food processing (e.g. Principle 4)
- Distribution (e.g. Principle 3)
- Meal preparation (e.g. Principle 4)
- Waste disposal (e.g. Principle 6).

(The Principles in parentheses are discussed in Section 3)

In addition to the well-known methodology of life cycle assessment (LCA), which considers mainly the environmental impact of products, in our concept the effects of the stages of the food supply chain are systematically illustrated through all five dimensions of Sustainable Nutrition (Curran, 2013).

The concept is an effective communication tool based on holistic thinking as it transforms scientific research into ESD practice. One example is the new Online-Video-Course in German titled "Sustainability and Nutrition", mentioned above. RCE Munich is one of the project promoters. The target groups are multipliers from different professional fields, for example, nutrition sciences and nutrition education, development cooperation, environmental education, as well as students, dieticians and interested consumers.

The participants are invited to reflect critically on the consequences of their personal nutrition habits as well as on the global food systems. They, thus, improve their knowledge of holistic interactions of sustainability in nutrition and their consumer skills. As a next step they may identify solutions, and may be motivated to integrate the newly achieved knowledge both in their personal lives and their professional work. The course consists of nine units (18 lectures of 30-60 minutes each). The videos and slides are available for free (for private use) on YouTube (https://www.youtube.com/channel/UCIaxfPuvIGVmJ2FNm6u_pZw or <http://www.nachhaltigeernaehrung.de/ONLINE-VIDEO-KURS-Nachhaltigke.97.0.html>).

The educational use of the Online-Video-Course is planned at several German universities. It has been approved as "an affiliated project of the 10YFP (10-Year Framework of Programmes on Sustainable Consumption and Production Patterns) Sustainable Food Systems Programme" of the United Nations (<http://www.unep.org/10yfp/about/what-10yfp>).

In the following section, the topics of the concept as well as those of the Online-Video-Course will be presented (Figure 2).



1	Sustainability and global challenges	Global challenges
2	Climate change and global food insecurity	
3	Preference of plant-based foods	Principles for Sustainable Nutrition
4	Sustainable/organic foods	
5	Regional and seasonal products	
6	Preference of minimally processed foods	
7	Fair Trade products – food security strategies	
8	Resource-saving housekeeping	
9	Tasty meals – enjoyment without regret	

Figure 2: Contents of the Online-Video-Course, Working Group Sustainable Nutrition.

2. Global Challenges Associated with Nutrition

Mankind is currently faced with a multitude of global challenges; some of them are significantly impacted by food habits. Examples are poverty, food insecurity, climate change, soil degradation, biodiversity loss, and water scarcity, as well as economic and financial crises (Koerber, 2015; Koerber, Bader and Leitzmann, 2016). This section focuses on climate change and food insecurity.

1. Climate Change (OVC, Unit 2.1)

The Intergovernmental Panel on Climate Change states that "human influence on the climate system is clear". Therefore, humans are also responsible for combatting climate change (IPCC, 2014).

High income countries are the main contributors to climate change. To reduce the greenhouse gas (GHG) emissions significantly, climate specialists demand the following actions: to create a climate-friendly society, increase energy-efficiency and prefer renewable energy sources over fossil fuels (WBGU, 2014). Additionally, a shift towards sustainable lifestyles (which include mobility, habitation, nutrition, energy production, land use and other factors) should be adopted.

In Germany, 25% (and globally more than 30%) of the total emissions are caused by different stages of the food chain (WBAE and WBW of the BMEL, 2016). GHG emission per person per year is estimated to be 2,000 kg, considering all stages of the food supply chain. Each food group contributes different amounts of GHG emissions (Figure 3). In total, 32% of GHG emissions are caused by plant-based foods and 68% by animal-based foods (WWF Germany, 2015). Yet, the consumption of animal products accounts only for 30% of the daily energy intake (DGE, 2012). Consequently, a preference of plant-based foods could significantly reduce the climate impact caused by nutrition.

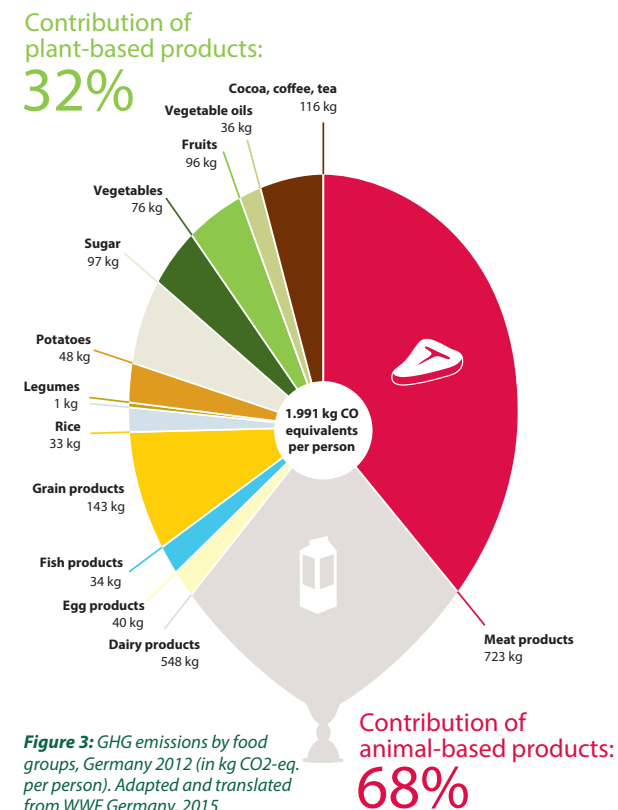


Figure 3: GHG emissions by food groups, Germany 2012 (in kg CO₂-eq. per person). Adapted and translated from WWF Germany, 2015.

2. Global Food Insecurity (OVC, Unit 2.2)

Worldwide, about 795 million people are undernourished (FAO, 2015). One in nine persons is suffering from undernourishment (WFP, 2015). The highest total number of undernourished people lives in South Asia, followed by Sub-Saharan Africa, which has the highest prevalence of undernourishment in terms of percentage of undernourished population (FAO, 2015). If people with micronutrient deficiencies – so called "hidden hunger" (Deutsche Welthungerhilfe e. V., 2015) – are considered,

about two billion people (of the current world population of 7.5 billion) suffer from insufficient food intake (UNFPA, 2016). In 2012, storms, floods and other climate-change-associated catastrophes forced about 32 million people to flee their homes, which led to a further increase in food insecurity (WBGU, 2014). Currently billions of people are living in poverty, which strongly correlates with undernourishment. Distribution of global wealth is also highly unequal; about 70% of the world's population possesses only 3% of the global wealth, whereas nearly 10% of the population possesses more than 80% (World Economic Forum, 2014).

Similar conditions apply to land use. People from the Global North claim much more land due to their higher consumption of animal-based products. "Food transformation losses" occur when energy stored in plants is transformed to energy in animal products. However, a moderate consumption of products from ruminants, which can feed on grasslands, not suitable for arable farming, such as beef and dairy products, is acceptable because of "food transformation benefits". These products play an important role in global food security. This applies, however, only to products of extensive and sustainable livestock farming on permanent pastures (Koerber and Hohler, 2013; Koerber and Leitzmann, 2011; WWF Germany, 2011; Idel, 2012).

With a growing world population and urbanisation, our consumption patterns are crucial for food security. By 2050, 66% of the world's population is expected to live in cities (UN Population Division, 2014), where food choices tend to be animal-based products and energy-intensive convenience foods (Shetty, 2013). This trend, which demands the use of extensive tracts of land, has already started in some transition countries such as China (Steinfeld et al., 2010). These dietary changes are predicted to have a higher impact on land use than population growth (Gerbens-Leenes and Nonhebel, 2002).

3. Principles of Sustainable Nutrition

The concept of Sustainable Nutrition has developed consistently over the last 40 years with the objective to address global challenges. It contains seven principles, which are phrased in a motivational way. The underlying substantiations are systematically ordered in the five dimensions: health, environment, economy, society and culture (Koerber, Männle and Leitzmann, 2012; Koerber and Hohler, 2013; Koerber, 2015; Leitzmann, 2003; Koerber and Leitzmann, 2011; Hoffmann, Schneider and Leitzmann, 2011; Schneider and Hoffmann, 2011; Koerber, Bader and Leitzmann, 2016).

1. Preference of Plant-Based Foods (OVC, Unit 3)

Environment: The preference of plant-based over animal-based foods is the most important principle, as the GHG emissions of the former are much lower. Furthermore, the water-footprint of plant-based foods too is lower (Mekonnen and Hoekstra, 2011, 2012). Due to the low-efficiency conversion of animal feed into food, the land used for plant-based foods is significantly less than for animal-based foods. Today 60% of the global fish population is exploited to the maximum and 30% is overfished – only 10% is moderately or hardly fished. Every year, millions of tons of fish, the so called “by-catch”, die in nets and are thrown back into the oceans (WWF Germany, 2016; Maribus, 2013).

Society: 70% of the worldwide agricultural land is under pasture, which is usable in a productive way solely by ruminants. Yet, one third of the arable land is used for animal feed production (FAO, 2006). The resulting meat and dairy products cause “food transformation losses” and therefore potential food calories are lost. Feed and food imports create conflicts for land use in low-income countries. Highly problematic for both people and climate is especially the deforestation of tropical rainforests for soy and palm oil production or for pasture land (Koerber, Kretschmer and Prinz, 2008). Legal fishing based on EU fishing quotas and fisheries’ agreements, and especially illegal poaching by industrial fishing fleets, can threaten the existence of local fishermen. This has been happening, for example, in African countries where the local fishermen are facing unemployment, poverty, and thus are forced to migrate (Koerber and Hohler, 2013).

Health: Consuming plant-based foods increases the consumption of complex carbohydrates and reduces the consumption of fat, saturated fatty acids, cholesterol and purines. Some plant foods contain high amounts of certain vitamins, minerals and phytochemicals. Dietary fibre, which is present only in plant foods, increases satiety, while the energy content is the same or reduced compared to animal-based foods. Studies with vegetarians show several health benefits when compared with meat eaters (Leitzmann, 2005; Leitzmann and Keller, 2013).

Economy: Preferring plant-based foods is less expensive except for low-quality products (Koerber, 2015). Above all, nutrition-related diseases create high costs for health systems. In Germany, for example, they account for about 30% of the total healthcare costs (Koerber, Männle and Leitzmann, 2012).

Culture: In 1950 Germans consumed less than half the amount of meat compared to today (DFV, 2015). Meat was consumed about once a week, except by nomads who depended on ruminants. Today, high meat consumption has become normal in most high and middle-income countries (Shetty, 2013). Yet, creative vegetarian dishes allow for new taste experiences.

2. Organic Agriculture (OVC, Unit 4)

Environment: Organic agriculture is a farming system that considers natural cycles and provides various ecological benefits. Usually the energy efficiency in organic agriculture is higher than in conventional agriculture. GHG emissions, phosphorous and nitrate leaching are decreased per unit of field area. These benefits are not yet clear, if systems are compared per unit of output. A lower amount of harmful residue, like pesticides and animal medication, remain in the soil. Higher soil carbon levels have been found in organic farming, which indicates a higher absorption of CO₂ from the atmosphere and a greater build-up of humus (Reganold and Wachter, 2016; Hülsbergen and Schmid, 2010). Organic farming practices species-appropriate husbandry, like more space and free range for the animals. The use of controversial technologies such as genetic modification or radiation treatment of foods is not permitted.

Economy: Farmers benefit from higher prices of organically grown food. Manual labour in organic agriculture and farm-based processing as well as direct marketing has the potential to create more jobs. This results in a price difference compared with conventional products. Yet, the higher costs must be put into perspective as negative externalities (such as environmental or social costs), which are higher in conventional farming, tend to be neglected in most cases.

Society: The import of feed from low-income countries is avoided in high standard organic farming (Koerber and Hohler, 2013). In the Global South organic farming can result in yield increases compared to present farming systems and contributes to food security (Badgley et al., 2007; Pretty et al., 2006; Reganold and Wachter, 2016). Organic farms often provide additional services such as teaching farms and inclusion of people with disabilities.

Health: Organic foods usually contain less pesticides, nitrates, animal medication and food additives. Artificial additives like colourings, sweeteners, stabilisers and flavour enhancers are prohibited in organic farming. Organic foods can contain a higher amount of phytochemicals (Koerber and Hohler, 2013).

Culture: Organic farming often fulfils the increasing demand of consumers for more naturalness and a more intense taste. Transparency and trust between producers and consumers are higher due to their increased social interactions (Koerber, 2015).

An overview of the different impacts that conventional and organic farming has regarding sustainability is illustrated in Figure 4. Each flower petal is a sustainability indicator. The lengths of the flower petals indicate their level of performance regarding sustainability. Blue petals stand for environment; red petals represent economy; the green petals illustrate well-being and the orange petals show areas of production. Obviously organic farming is better balanced in the respective sustainability dimensions than conventional farming (Reganold and Wachter, 2016).

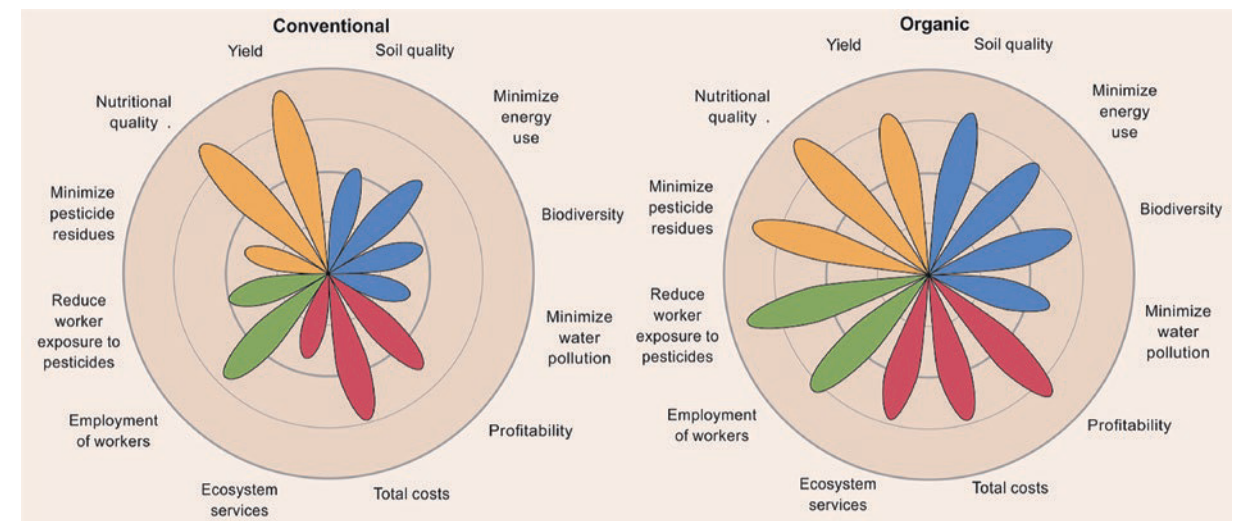


Figure 4: Assessment of organic farming relative to conventional farming in the four major areas of sustainability. (Reganold and Wachter, 2016).

3. Regional and Seasonal Produced Foods (OVC, unit 5)

Environment: Energy consumption and GHG emissions are reduced if regional and seasonal products are consumed, due to shorter transportation and avoidance of production in heated greenhouses (Demmeler and Heißenhuber, 2003). Air transport in particular causes much higher emissions and uses much more energy than land or water transport. Similarly, trucks emit and consume more than trains (Hoffmann and Lauber, 2001).

Economy: Regional networks among farmers, processors, retailers and consumers support small and medium-sized businesses, thereby securing livelihoods (Koerber, 2015). This economic benefit can also lead to a general development of the region.

Society: More transparent structures are likely to prevent illegal practices and food scandals, thereby strengthening consumer confidence in food safety (ibid.).

Health: Seasonal products, which are not produced in heated greenhouses or plastic tunnels, usually contain fewer chemical residues like pesticides. The content of essential and health-promoting substances can be higher in regional products due to a prolonged ripening period (Koerber and Hohler, 2013).

Culture: The prolonged ripening period is likely to increase the taste of regional and seasonal products. The appreciation of regional specialties and biodiversity is on the rise. The diet is more diverse if seasonal variations are part of the food choice (Koerber, 2015).

4. Preference of Minimally Processed Foods (OVC, Unit 6)

Health: Highly processed foods like fast food often contain a lot of fat, sugar and salt, as well as food additives (Koerber, et al., 2012). Food processing like heating, and separation of ingredients like milling of grains can destroy or remove essential and health-promoting substances. However, a few processing methods, like fermentation or sprouting of seeds, increase the amount of desirable ingredients. Minimally processed foods, on the other hand, tend to contain a higher density of nutrients and fewer calories.

Environment: Food processing entails high use of energy and virtual water as well as high pollutant emissions. Less processing reduces the transport volume between single processing stages and the necessity of intermediate packaging (Koerber, 2015).

Society: The preparation of raw foods increases the appreciation for these products and for people working in the food supply chain, for example through direct contact at farmers markets (*ibid.*).

Economy: Basic foodstuffs are generally less expensive than convenience products or fast food. Sweets, snacks and alcoholic drinks are higher-priced except for highly processed superfine flour (Koerber and Hohler, 2013).

Culture: Food preparation with natural and fresh products is more time-consuming but can increase the appreciation and pleasure of the meals thus prepared. It can improve cooking skills and the sensory perception. Food preparation can also be a social event (Koerber, 2015).

5. Products of Fair Trade (OVC, Unit 7)

Economy: Fair traded products ensure higher incomes for producers, both in the South and the North. Local farmers depend on fair and stable prices to cover their expenses. With a reduction of intermediate trade, long-term guaranteed purchases and prepayments increase planning security in the Fair-Trade system (Fairtrade International, 2011).

Society: In the Fair-Trade system, child labour and forced labour are excluded. The system promotes, for example, training opportunities for local producers, facilitates the founding of labour unions, strengthens collective bargaining power, and supports social projects (*ibid.*). Furthermore, Fair Trade provides social insurance for workers.

Environment: Fair Trade standards set a focus on environmental requirements such as reduced use of agrochemicals, waste management and drinking water protection. It also promotes organic agriculture (*ibid.*).

Health: Enhanced health and safety measures implemented to meet Fair Trade standards, and higher wages that allow higher spending on food and education, can lead to an improved nutritional and health status (*ibid.*).

Culture: Especially in high-income countries, education is required to create acceptance of the higher prices of Fair Trade products, and to raise the sense of responsibility, for example, by highlighting the small price difference between a conventional and a Fair-Trade cup of coffee (Koerber, 2015).

6. Resource-Saving Housekeeping (OVC, Unit 8)

For resource-saving housekeeping the following aspects are important.

Switching to renewable energy – Most steps of the food supply chain, such as production, processing and household activities, need a lot of energy. The generation of electricity from fossil resources such as coal, oil or natural gas produces high amounts of GHG. In general, renewable energy is safer and more climate-friendly (Koerber and Hohler, 2013).

Energy-saving in the kitchen – Electrical devices like refrigerators or dishwashers can use a lot of energy. Therefore, energy efficient devices should be used. Energy labelling of electrical devices in the EU ranges from A+++ for highly efficient to D for low energy efficiency (DENA, 2014).

Mode of transport for shopping – Grocery shopping on foot, by bike or public transport is more climate-friendly and cheaper than by car, which is the most environmentally damaging type of transport. If cars are used on a regular basis, all efforts to adopt a climate-friendly diet, such as by eating fewer animal products, are negated (Koerber and Hohler, 2013).

Ending food loss and waste – Globally, about one third of the food is wasted (FAO, 2013). In Germany, about half of the food loss and waste is caused by private households (Kranert, 2015). Considering that 795 million people globally are undernourished, food loss and waste is ethically irresponsible. Thus awareness-raising about this issue is essential (Koerber and Hohler, 2013).

Ending packaging waste – In Germany, a person uses 145 kg of packaging per year on average, mostly from food products. To reduce packaging waste, unpackaged products or reusable packaging is recommended. Generally, reusable packages are more climate-friendly (*ibid.*).

7. Tasty Meals (OVC, Unit 9)

The joy of eating tasty meals is not contradictory to satisfying health, ecological, economic and social requirements of sustainable nutrition. Pleasure is crucial for implementing sustainability, not only in the field of nutrition (*ibid.*).

4. Challenges for a Transformation of Principles into Reality – Best Practice: “Organic City Munich”

The principles of Sustainable Nutrition raise the question of how consumers can transform them into reality. One of the biggest challenges is the lack of willingness to pay more for sustainable products. They cannot be offered for the same low price because the “true costs” of non-sustainable production are hidden. Optimisation of political and economic conditions is necessary. This includes tax incentives, internalisation of external costs, clear labelling initiatives as well as availability of and education about sustainable products (Koerber, 2015). Sustainability should be approached as a multi-stakeholder process. In Munich, a major stakeholder is the City of Munich, along with the Department of Health and Environment and the Department of Education and Sports. In the childcare sector, the City of Munich is responsible for providing Sustainable Nutrition to children at pre-schools and primary schools within its coverage area. At present (2017), about 22,000 pre-school children and 30,000 primary school children are participating.

Efforts in this direction started more than two decades ago. In 1992, the municipal water supplier started an organic farming programme to protect the water sources.

In 2006, the city of Munich took the title of “Organic City Munich” (*Biostadt München, 2006*). According to a resolution by the city council, the city committed itself to increase the use of organic food (SDG 3, 15) in city-run establishments (GAP AA2), thereby aligning with the Sustainable Development Goals (SDGs) and the Global Action Programme (GAP)¹ for ESD. Munich was recognised as a Fair-Trade City (SDG 8, 10) in 2013 (*Fair Trade Stadt, 2013*).

Under the slogan “organic – regional – fair” projects, action fields and issues affecting the entire supply chain were tackled (SDG 2, 12), ranging from agriculture, processing and distribution of food products to preparation and consumption of food.

In October 2016, as part of the objective to use more animal-welfare-friendly products, the city council resolved

to further increase the proportion of organic meat and other products in its establishments and to strengthen economic demand for regional products. Meat-based dishes at municipal receptions must use 100% organic meat. In city-run canteens the target is to raise the current 20% proportion of organic meat to 30% (*City of Munich, 2016*).

In the initial pilot programme “Bio für Kinder” (Organic for Children), which ran between 2006 and 2008, first experiences were made together with an ecologically-oriented festival operator (*Tollwood, 2017*). This pilot programme investigated which factors were relevant, explored the levels of costs involved and the management competences required to make childcare catering facilities 100% organic (GAP AA2 and SDGs 2, 8). The results showed that participating institutions could implement 100% organic products with an additional cost of only € 0.34 per child per midday meal (*Tollwood, 2017*).

The seven principles for Sustainable Nutrition were used to adjust the menu plan: Seasonal dishes with fresh ingredients (Principle 3); organically-grown products (Principle 2); integrating participants in the project goals, improving kitchen management and purchasing mainly fair trade goods (Principle 5); reducing meat content (Principle 1) and food waste (Principle 6); prioritising food that is minimally processed (Principle 4); and serving tasty, wholesome dishes (Principle 7).

To support kitchen managers, an online organic menu manager was developed and made available free of charge to all non-profit organisations (www.biospeiseplan.de) (GAP AA2, AA5 and SDG 17). The planner offers recipes and long-term healthy menus accepted by children. This online application also makes it possible to calculate purchasing volumes, costs and age-specific portion sizes to enable cost-conscious kitchen management.

Based on these project experiences of Sustainable Nutrition, in 2012, a new quality assessment (GAP AA1, AA2 and SDG 16) was introduced as the basis for the city’s Europe-wide call to tender for catering in its pre-schools, day-care centres and other interested schools. Catering firms are bound by the following conditions: 50% organic produce in all product groups, 90% organic meat, meat and fish only once in a week, fish caught according to Marine Stewardship Council principles, no Genetically Modified (GM) products, Fair Trade cocoa, food to be bought locally to avoid unnecessary transport emissions, very low proportion of convenience products, and more.

¹ For GAP, see chapter 5.3 of this case study.

5. Change in Awareness by ESD

A change towards Sustainable Nutrition cannot be realised without education, because of the important role of people's consumption behaviour.

From a young age, children automatically develop and grow into their nutritional competence as they gradually explore the world of the (adult) eating culture. Because of the increasing disintegration of extended families, i.e. the absence of parents during the day due to their jobs, the task of providing responsible nutrition increasingly falls upon the pre-school and primary education sector.

For the "Organic City Munich", the result is that municipal employees ensure that at least the children in their care receive age-appropriate, healthy nutrition in a pleasant social environment. This promotes the children's personal and health development, and influences their mental and physical abilities and well-being positively.

1. Educational Concept – "Head – Hand – Heart"

Understand (head), do (hand), experience (heart):

To convince people about the importance of sustainability, it is crucial that they can familiarise themselves with the quality of sustainability. The power of persuasion is not in reduction and restraints, but in the credibility of people who have experienced this quality and have integrated it in their work. This principle pervades every aspect of the "Organic City Munich". Some examples:

In institutions: The "organic push" began in 2014, as the staff of all 400 municipal pre-schools was trained in the "head – hand – heart" principle to raise awareness of the new quality standards expected of them. Conveying knowledge of organic products (head), improving kitchen practices (hand) and visiting an organic farm (heart) are the three learning stages of all kitchen management and staff members.

In pre-schools: The cultural skills in a social context, such as how to eat, table manners and the variety of eating habits are important steps learned playfully by children in pre-schools.

In schools: Older pupils learn how to grow and cook food, and learn about organic farming methods, which leads to a greater appreciation of the food they eat.

In the catering trade: The menu provides information on the producers' animal welfare standards, while "gastro-trips" enable diners to see directly the benefits of animal welfare in agricultural settings.

2. Fields of Education

Formal Education

Pre-school, primary, secondary and higher education offer many possibilities to include Sustainable Nutrition in the curriculum. Focal points are found in the following subjects and parts of subjects: health and nutrition education, home economics, economics and social education, cultural education, geography and natural sciences.

An example of this is "educational cooking": At some grammar schools, classes of 12-year-olds make up the kitchen staff for one month. Purchasing, preparation, food service, point of sale, accounting and clearing away everything, are tasks the pupils perform under the supervision of the regular kitchen staff. They take responsibility for providing lunch to the entire school. Unimagined abilities are discovered; mathematical skills are practiced and, of course, cooking skills are developed. A similar structure is used by the numerous "pupil-led companies" in which pupils organise, prepare and sell break-time snacks.

Non-Formal Education

Educational institutions in the non-formal area are free to choose the most interesting aspects of Sustainable Nutrition for their clients. They can introduce selected aspects in environmental education, global citizen education as well as in cooking courses.

To give one example, acceptance of animal welfare (space, special needs) should be encouraged in the catering industry. Kitchen and service staff receive training on how to convey knowledge about the products used in kitchens. One method is "gastro-trips", where everyone (staff and diners together) can directly experience animal welfare at the producers' agricultural production site.

Informal Learning

Nutrition is not only a private, but also a public issue. To facilitate more sustainable consumer behaviour, producers could provide more sustainably produced foods and retailers could increase their availability and visibility. Many labels and signets exist for such foods, which need to be promoted, and should be clarified, for example by customer advice centres. All forms of media play an important role in the public dialogue on nutrition. Last but not least, information on culture by for example tourist agencies and *savoir vivre* events are also relevant.

The "Organic City Munich" participates in major events and projects such as the Streetlife Festival (a walking street in the city centre is transformed into a mile-long festival) and Mini Munich (children build, work and live in their own mini-city during the summer, taking on typical social roles, working in the mayor's office, the job centre and restaurants, as bakers, gardeners, and more).

3. Actions According to the Global Action Programme on ESD

To follow up and mainstream the experience during the UN-Decade of ESD 2005-2014, the United Nations agreed on a Global Action Programme (GAP) on Education for Sustainable Development. The various components of the "Organic-City Munich" as well as the Online-Video-Course are connected to the five Priority Action Areas, for example, political decisions (GAP-AA1), allocation of meals in educational institutions (GAP-AA2), Online-Video-Course (GAP-AA3), youth events (GAP-AA4) and multi-stakeholder partnership (GAP-AA5) (UNESCO, 2014).

This section describes how each of the GAP Priority Action Areas and some of the Sustainable Development Goals (SDGs) apply to the Sustainable Nutrition programme of the City of Munich and the Online-Video-Course.

Priority Action Area 1: *Advancing Policy*

Municipalities and governments are responsible for creating and enabling an environment for education on Sustainable Nutrition in the field of formal education. They must integrate Sustainable Nutrition into education policies. Through numerous resolutions (SDG 17), the Munich City Council has supported the promotion of education for sustainable development in nutrition. These are as follows:

- 2006: Foundation of "RCE BenE München" and start of the Organic City Munich project
- 2008: Programme to reduce consumption of meat and eggs (SDGs 2, 12)
- 2011: Launch of Organic for Children programme (SDGs 3, 15, 17)
- 2012: Munich applies to become a "Fairtrade Town" (SDGs 8, 10)
- 2013: Programme started to prevent food scandals (SDG 2, 12)
- 2015: Membership of the network of organic cities obtained
- 2016: City of Munich joined the Bavarian Eco-Pact and the "animal welfare" programme

Priority Action Area 2: *Transforming learning and training environments*

Nutrition is one of the most important aspects in the transformation of learning and training environments. Therefore, the principles of Sustainable Nutrition must be integrated into all education and training settings, especially in canteens. The principles of nutrition could be provided on a poster in a learner-friendly way. Additionally, waste management, a school garden as well as cooperation with organic farmers and beekeepers could be out-of-school educational facilities. School gardens



Baking pretzels together at streetlife-festival Munich (© Angelika Lintzmeyer).

not only develop practical gardening knowledge, but also influence nutritional habits; something that has been nurtured with care is more appreciated when eaten. “Since I experienced how much effort it takes, I’ve eaten the salad leaves with my break-time sandwich instead of throwing them away”, one pupil said.

In addition, in schools that were not previously subject to the city’s catering regulations (in Munich, food provision is the responsibility of the “school family”, i.e. the school management, parents and teachers), the proportion of organic meat used is reportedly on the rise. Pilot projects investigated how best to achieve these guidelines to additional schools after the pilot year, from an economic and organisational perspective. On the one hand, the kitchen staff is generally very interested not only to use 100% organic meat, but to convert the whole kitchen into a sustainable one. On the other, there are strict regulations in time and money and limited know-how. This needs more attention.

Priority Action Area 3: Building Capacities of Educators and Trainers

The educators and trainers should be prepared to present ESD more effectively and to connect education with nutrition. The Pedagogical Institute (Pädagogisches Institut) offers courses for teachers on school gardens and other topics. The videos and slides of the Online-Video-Course “Sustainability and Nutrition” have been available on YouTube since March 2017 (SDGs 1, 2, 4, 13). The target groups are multipliers from different professional fields, for example, nutrition sciences, development cooperation, environmental education, as well as students, dieticians and interested consumers.

Priority Action Area 4: Empowering and Mobilising Youth

The kitchen is a place of never-ending experimental learning. As a field of personal endeavour, Sustainable Nutrition is ideal for youth to act. The OPEDUCA Project in the Netherlands, for example, has implemented this in a notable way since 2008 (Eussen, 2012). The holiday programme “Mini-Mü” gives youth in Munich the opportunity to experiment with jobs for two weeks, for example in the field of nutrition.

Priority Action Area 5: Accelerating Sustainable Solutions at the Local Level

ESD multi-stakeholder networks with local partners from formal education, non-formal education and informal learning should scale up the promotion of Sustainable Nutrition combined with regional nutrition habits. Some examples of multi-stakeholder partnerships (SDG 17.16 and 17.17) are:

- **Knowledge sharing:** Organic-City Munich is using the concept of Sustainable Nutrition, developed by the Working Group Sustainable Nutrition. The Online-Video-Course is an example of free knowledge sharing (for private use), enabled by private and civil society partnerships.
- **Expertise sharing:** With the help of Organic-City Munich, an organic mentor network was set up in the collaboration project “Organic for Children”. Through this, experienced kitchen owners and managers visit educational institutions and work with kitchen staff to achieve an increased proportion of organic produce.
- **Resources sharing:** The Organic-City Munich works with profit and non-profit-organisations in different projects (public-private and public-civil society partnerships). The online organic menu manager (www.biospeiseplan.de) is one example of a technical resource developed by Organic-City Munich and made available free of charge to all non-profit organisations.
- **Developing effectiveness monitoring frameworks:** The Organic-City Munich has developed an evaluation framework to measure the effectiveness of its programme parts as well as of the work of partnering non-profit-organisations.

All these examples show how important the different forms of multi-stakeholder partnerships in the context of sustainable nutrition are.

4. Integration of Sustainable Nutrition in National and Global Activities

Since 2010, towns and cities in Germany that support organic farming and organic products have collaborated as a network of “organic cities” (www.biostaedte.de). The focus is on exchanging experiences, developing joint projects, obtaining subsidies, and conducting campaigns to raise awareness. Through membership of the network, German “organic cities” are seeking to pull more political weight behind the issue. The network is growing constantly and many non-member communities are also participating in this exchange.

The Working Group Sustainable Nutrition participates in the German campaign “Everyone can offer and prepare organic food” (“Bio kann jeder”). It has been running since 2004, and is part of a funding campaign of the Federal Ministry of Nutrition and Agriculture. In Bavaria, the campaign is carried out by the nutrition institute “KinderLeicht”. The main target groups are responsible persons in schools and daycare centres, such as educational staff and cooks, but also farmers, processors, distributors etc. The campaign’s workshops are conducted practically on organic products and sustainable nutrition in out-of-home catering for children and adolescents.

Global Activities

Sustainable Nutrition is integrated in global activities of the UN, especially in the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns (10YFP) (<http://www.unep.org/10yfp>). One of the 10YFP programmes is the “Sustainable Food Systems Programme (SFSP)”, run in connection with the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP). The goal of the SFSP is to promote, enhance and facilitate the shift towards more sustainable food systems.

The Working Group Sustainable Nutrition in Munich is a partner of the SFSP, and the Online-Video-Course Sustainability and Nutrition (mentioned above) is acknowledged as one of the currently ten affiliated projects (<http://www.scpclearinghouse.org/sustainable-food-system/affiliated-projects-sfs-programme>). The book *The Joy of Sustainable Eating* (Koerber and Hohler, 2013), was recognised by UNESCO as an official contribution to the UN Decade of ESD at the global level, and was presented during the Global RCE Conference 2013 in Nairobi.

The principles of Sustainable Nutrition became contractual for all events of the RCE Munich by 2008. RCE Munich hopes that more and more members of the RCE Munich as well as the global RCE community will follow these suggestions.

6. Conclusions

The concept of Sustainable Nutrition is an effective communication tool, as it transforms scientific research into ESD practice (examples include the Online-Video-Course, Organic-City Munich). It is based on holistic thinking and considers the multi-dimensional interactions along the food supply chain. The concept has the potential to cope with some of the global challenges in the field of nutrition.

Sustainable Nutrition promotes the following targets within the five dimensions (in correlation with the SDGs):

- Preventive health protection (SDG 3)
- Fair economic relationships (SDG 8)
- Social justice (SDG 1) and food security (SDG 2)
- Climate protection (SDG 13) clean air and water, healthy soils (SDGs 14, 15)
- Enjoyable eating culture

To reach these benefits, it is crucial to increase the appreciation of our food and for the people working in the food supply chain in the Global South and North. The experience in Munich shows how many political

decisions are necessary to move forward in the direction of Sustainable Nutrition. The installation of municipal coordination centres for other regions that will prepare decision memos, implement and evaluate the effectiveness of sustainable nutrition programmes is recommended. ESD is a promising way to raise awareness about sustainably produced foods. It requires the commitment and support of all stakeholders, scientists, educational institutions, multipliers and consumers to promote the transformation towards a sustainable society.

Governments play an important role in this process. Tools like tax incentives, which allow a privileged treatment of sustainably produced foods, or an increased support of ESD measures can give a new impetus to this transformation.

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